observations, it would be a matter for congratulation. When a meteor is observed by two or more practised observers, the results usually work out very well; but in the case of large fireballs witnessed by a great number of persons, the descriptions are often very conflicting and dubious, and the discussion of such materials is seldom either profitable or trustworthy. W. F. Denning.

RUDOLF LEUCKART.

Rudolf Leuckart, whose death removes one of the most eminent figures in the zoological world, was the son of a bookseller, and was born on October 7, 1822, at Helstedt, which until 1809 had been the seat of one of the universities of the state of Brunswick. A taste for the study of natural history was probably hereditary in the family, for his uncle, Friedrich Sigismund Leuckart (1794–1843), was a zoologist of no mean reputation. The subject of our sketch began his career as an author at a comparatively early age, for whilst still a student at the University of Göttingen he completed the "Lehrbuch der Zootomie" of his teacher, Rudolf Wagner. After serving for a time as assistant in the Physiological Institute of his *alma mater*, he received in 1850 the appointment of extraordinary professor at Giessen, which the genius of Liebig had then raised to a position of great importance among the universities of Germany.

He had already shown what manner of man he was by the publication of two treatises, "Beiträge zur Kenntniss wirbelloser Thiere" (in conjunction with Heinrich Frey, 1847) and "Ueber die Morphologie und Verwandtschaftsverhältnisse der wirbellosen Thiere" (1848), in which the great division *Radiata* of Cuvier was broken up into *Cœlenterata* and *Echinodermata*. He further recognised Metazoa as divisible into six types—*Cœlenterata*, *Echinodermata*, *Vermes*, *Arthropoda*, *Mollusca* and *Vertebrata*—and thus initiated a system which, in its main features, is still maintained at the present day, and must be recognised as a stroke of genius in a young man of some twenty-five summers, working at such an early stage in the history of morphological science.

In 1855 he was made ordinary professor, and in 1870 removed to Leipzig. As a teacher he was clear and stimulating, and his remarkable success in this department of scientific work is attested by the volume issued in commemoration of his seventieth birthday, in which about 139 men of science, including many of the most eminent zoologists of the day, are proud to acknowledge themselves his pupils.

As an investigator he fully realised the promise of his early youth. His knowledge was as accurate as it was extensive, and that to a degree which only becomes comprehensible when we remember that unaided he contributed for nearly forty years a masterly summary of current researches into the natural history of the lower animals to the pages of the *Archiv für Naturgeschichte*. It is clearly impossible to give anything like a detailed account of such an active and many-sided career in a moderate space: let it suffice to recall his insistence on the division of labour in the animal kingdom, his researches on the reproduction of bees and of the Cephalopoda, his recognition of the ciliated organ of Heteropoda and Pteropoda as an osphradium, and his reference of *Neomenia* to the Mollusca.

Undoubtedly, however, his greatest energy was devoted to the study of parasitic life in general and to the life-history of the parasitic worms in particular. He at once recognised the importance of the methods of experimental helminthology introduced by Küchenmeister, and demonstrated the life-history of nearly all the bladder-worms then known by rearing them in suitable hosts. He was the author of epoch-making researches on *Trichina* and on the *Pentastomida*, and contemporaneously with the Englishman, A. P. Thomas, worked out the life-history of the Liverfluke. His work on the "Parasites of Man," the first volume of which has been translated into English, is a perfect cyclopædia of information derived from the writings of others and from his own observations. He has passed away full of years and full of honours, leaving a name which will ever be venerated by zoologists of every tongue and nation.

NOTES.

The first soirée of the Royal Society, to which gentlemen only are invited, is fixed for Wednesday, May 11.

On Saturday last (April 2) the Council of University College, London, elected Prof. H. L. Callendar, F.R.S., to the Quain Professorship of Physics, about to become vacant by the resignation of Prof. G. Carey Foster, who in a few months will have held his Professorship in University College for thirty-three years. Prof. Callendar, who has been Professor of Physics in McGill College, Montreal, will enter upon his duties in London in October next.

Sir William Turner, F.R.S., professor of anatomy in the University of Edinburgh, has been elected a corresponding member of the Berlin Academy of Sciences. He has also been elected president of the General Medical Council, in succession to the late Sir Richard Quain.

Prof. H. C. Bumpus has been appointed director of the laboratory of the United States Fish Commission Station at Wood's Holl.

Sir Samuel Wilks has been re-elected president of the Royal College of Physicians of London.

M. Richet has been elected a member of the Paris Academy of Medicine.

A "Jardin de Kew" is to be established in the neighbourhood of Nantes by a rich citizen of that town. The new botanical garden will be planned on the same lines as the Royal Gardens at Kew, and special attention will be given to the cultivation of plants useful in French colonies. It is hoped that the garden will eventually do for French colonial possessions what Kew does for British colonies.

The Paris correspondent of the *British Medical Journal* announces that a recent decree authorises the University of Paris to borrow 68,000*l.* for the purpose of building laboratories where physical science, chemistry, and natural history will be taught for the benefit of students who are preparing for the examination for Science Certificate. Part of the money is to be applied to the completion of the Laboratory of Vegetable Biology belonging to the University of Paris at Fontainebleau.

The policy exemplified by the following appointment, announced in *Science*, might be adopted with advantage in this country:—Dr. Charles Wardell Stiles, of the United States Department of Agriculture, has been appointed *attaché* to the United States Embassy in Berlin. Dr. Stiles's duty will be to keep the Agricultural Department informed on important discoveries and other matters of interest to agricultural science, to defend American meats, fruits and other exports against unjust discrimination, and to advise the Secretary of Agriculture from time to time concerning the purity of the food products that are shipped from Germany to the United States. It is said that the appointment of Dr. Stiles will probably be followed by other similar appointments, and it consequently represents an important advance in the application of scientific principles to diplomatic and commercial affairs.

A LETTER received a few days ago by Prof. Milne from Mr. H. Hamilton, Montserrat, West Indies, contains somewhat startling information. It appears that since the flood of November 29, 1896, which caused great injury to life and property in Montserrat, innumerable earthquake shocks have been experienced. There are several craters and sulphur springs in the island, and it is thought that the mouth of one of the numerous craters was filled up by a landslip caused by the flood referred to, for several shocks of earthquake—the first experienced for a great number of years—were felt on the night of the flood. It is suggested that the filling up of this crater has been the cause of all the earthquakes which have lately occurred in the island. But whatever may be the cause, there is no doubt that since November 1896, the island has been in a very disturbed seismological condition. Scarcely a day passes without a few shocks being felt, and as many as thirty distinct disturbances have often been experienced in one day. On February 15, 18 and 20 of this year, alarming shocks were felt; and it is affirmed that the worst shock on February 15 (11.16 a.m.) was just as severe as the great earthquake of 1843, but being of shorter duration it did not do so much damage. Several buildings have, however, been very badly damaged by the constantly-occurring disturbances, and innumerable cracks have appeared in nearly every stone building in the island. These earthquakes, says Mr. Hamilton, which have been continually felt since November 1896, are causing great anxiety among the inhabitants, and it is feared that the shocks will culminate in a volcanic eruption, or that the numerous stone buildings, weakened as they already are by the continual shocks, must in course of time be thrown to the ground unless the disturbances cease. The whole subject demands scientific inquiry, and it is to be hoped, both in the interests of science and of the people of Montserrat, that the Colonial Office, which has probably received official reports of the earthquakes, will send some one to the island to investigate them.

THE numerous cases of enteric fever which have been traced to the consumption of contaminated oysters, clearly points to the need of a change in the present condition of the law relating to the culture of oysters and other shell-fish. For the purpose of submitting a memorial in favour of an alteration of this law, a deputation from the corporations of twenty-five provincial towns, and the London County Council, waited upon the President of the Local Government Board a few days ago. As the law now stands, local authorities have no means of preventing the sale of shell fish within their districts, even though they possess the clearest evidence that the consumption of the shell-fish has produced typhoid fever, and that the shell-fish is derived from a source known to be contaminated with sewage. In reply to the deputation, Mr. Chaplin said that he considered that the time had arrived for legislative action, and he had been engaged for some time on the measures necessary and appropriate to deal with the matter. As to the dangers which might arise from the sale of infected shell-fish other than oysters, he had not sufficient information to act upon, but with regard to oysters he hoped it would be possible for him soon to take action which would be satisfactory to the deputation.

A HOLIDAY course of science lectures and demonstrations will be held in Berlin from Wednesday, April 13, to Saturday, April 23. Lectures on most branches of science have been arranged, and visits will be made to museums and other places of scientific interest.

A MEETING of the Institution of Mechanical Engineers will be held on Wednesday and Friday, April 27 and 29. The chair will be taken by the President, Mr. Samuel W. Johnson, who will deliver his inaugural address at the opening meeting. The following papers will be read and discussed, as far as time permits:—"First Report to the Gas-Engine Research Committee: description of apparatus and methods, and preliminary results," by Prof. F. W. Burstall; "Steam Laundry Machinery," by Mr. Sidney Tebbutt.

ATTENTION has already been drawn in NATURE to the publication by the Geological Survey of a colour-printed map of the London area and great part of the Weald. This was Sheet 12 of the General Map on the scale of an inch to four miles. We are now able to state that all the fifteen sheets of this map have similarly been issued in the colour-printed form, at a uniform price of *2s. 6d.*, with the exception of the title-sheet, the price of which is *2s.* The total cost of the map, which if mounted would measure about 8 by 6 feet, is *1l. 17s.*

A CORRESPONDENT from Bangor writes:—"An instance of a locally acquired habit in birds, on which it would be interesting to collect information from different districts, is afforded by the behaviour of sparrows towards the flowers of garden crocuses. Here in Bangor we have had crocuses blossoming two years in succession without a single flower being eaten off; in gardens at Cambridge, and other places, every flower is pulled to pieces almost before it has fully opened. It would seem that the flowers contain some agreeable flavouring matter which the Bangor birds have (fortunately) not yet learnt to appreciate."

MR. G. MARSHALL WOODROW, Professor of Botany at the Royal College of Science, Poona, went to Jeur at the time of the recent total solar eclipse, and made some botanical observations which he communicates to the *Gardener's Chronicle* (March 19). This station was not very suitable for luxurious vegetation, as the daily range of temperature during January was too great, the thermometer ranging from 45° F. to 145° F. and in the shade from 50° F. to 90° F. He, however, collected 130 species, including 26 Gramineæ, 27 Leguminosæ, 14 Compositæ, 9 Acanthaceæ, 5 Asclepiadaceæ, 5 Euphorbiaceæ, 5 Malvaceæ, 5 Cucurbitaceæ, 5 Convolvulaceæ, 2 Solanaceæ, 4 Labiatæ, 2 Urticaceæ, and 2 Capparidaceæ. Of the Gramineæ he mentions that the most frequent one, *Aristida setacea*, was in ripe seed, and it was interesting to observe its manner of distributing them. Its three-branched awns "twist together in such a manner that a perfect sphere is formed by their extended points, and the balls roll hither and thither in every breeze." Another grass of interest is the species Isachne, which has the habit of setting loose its entire inflorescence, a large open panicle of most elegant form, which is rolled about by the wind till it is caught in some bush. This species has an inflorescence larger than any other known; and since it was found while preparing to observe the eclipse, the name *Isachne obscurans* is proposed for it. Prof. Woodrow mentions that as the sunlight began to fade away, owing to the passage of the dark moon, Leguminosæ began to fold up their leaves, as is their manner at evening time.

MR. H. C. RUSSELL, Government Astronomer of New South Wales, has communicated a second paper to the Royal Society of that Colony, on the subject of icebergs in the Southern Ocean, from reports collected from masters of vessels trading to Sydney and from other sources. The first paper dealt with the icebergs in the South Atlantic which had been reported up to July 1895, and the present paper continues the discussion down to September 1897, during which time the great mass of the bergs has drifted from the South Atlantic to between longitude 40° and 80° in the South Indian Ocean, and have been subsequently reported south-eastward of New Zealand. It is somewhat remarkable that for months at a time very few icebergs were met with by vessels trading to Australia, and their motion into and out of the tracks of vessels made it seem probable that it was affected by the prevalent winds. A reference to the weather charts showed that when there was a prevalence of north-west wind no ice was reported, while with southerly winds bergs were frequently observed. Mr. Russell states that the records are too short to settle the question, but he is of opinion that by careful study of the winds in connection with the movements of the bergs it will be possible to forecast their positions from the winds prevailing in South Africa and Australia.

The Pilot Chart of the North Pacific Ocean for the month of March, published by the Hydrographer of the United States Navy, contains tables and charts giving the mean temperatures of the surface waters for each quarter and for the year for that part of the North Pacific Ocean comprised between latitude 30° and 60° N., and the west coast of North America and longitude 180° W. The material has been obtained from observations in the possession of the United States Hydrographic Office, supplemented by the data contained in the Russian Admiral Makaroff's work, "The *Vitiaz* and the Pacific Ocean." The coldest region is in 55°-60° N., and 155°-180° W., having for the months of May to September a mean temperature of 43°. In the same longitude, and latitude 50°-55° N., the mean annual temperature is 42°. The warmest region is in latitude 30°-35° N., longitude 140°-165° W., having a mean annual temperature of 68°. The yearly range of monthly temperature is highest in latitude 35°-40° N., longitude 150°-180° W., being 18°·5, and lowest 8°·5, in latitude 30°-35° N., longitude 115°-145° W.

The report of Mr. S. P. Langley, Secretary of the Smithsonian Institution, for the year ending June 30, 1897, has just reached this country. Following the custom of several years, Mr. Langley gives in the body of the report a general account of the affairs of the Institution and its bureaus—the U.S. National Museum, the Bureau of American Ethnology, the International Exchanges, the National Zoological Park, and the Astrophysical Observatory—while more detailed statements by the officers in direct charge of the various branches of the work are given in an appendix. We regret to see, in the report on the work of the National Museum, that the complete manuscript of an important and comprehensive work by the late Prof. Cope on the reptiles of North America, based on the museum collections, is withheld from the printer for want of funds for its publication, and at least four others, equally valuable and extensive, now in an advanced stage of preparation. Delay in the publication of these works will prove a hindrance to the progress of American natural history. The Bureau of American Ethnology has been very active. The field operations have been extended into a large number of states and territories, and incidentally into those districts of neighbouring countries occupied by native tribes closely affiliated with the aborigines of the territory now comprised in the United States. During the year covered by the report special attention was given to the classification of the tribes in such manner as to indicate their origin and development, and to this end the rich archives of the Bureau, comprising the accumulations of eighteen years of research, have been subjected to careful study, and important conclusions have been reached. The International Exchange Service continues to increase; and the fact that exchanges are now made with 28,000 correspondents in every part of the civilised world demonstrates, to some degree, the far-reaching influence of the Institution. The National Zoological Park has been improved by the construction of roads and a new bridge; but the buildings and enclosures of the Park are altogether inadequate, and there are no funds to supply the wants. Among the needs are suitable houses for the preservation and care of birds, a vivarium for small animals, and ponds for aquatic birds and mammals. The operations of the Astrophysical Observatory have consisted chiefly in experiments in the bolographic analysis of the infra red solar spectrum. The report upon this work has been completed; and it contains, in addition to introductory, historical, descriptive, and theoretical matter and accounts of subsidiary investigations, tables of positions of 222 absorption lines in the infra-red solar spectrum in terms of angular deviations and refractive indices for a rock-salt prism, and of the approximate wave-lengths corresponding. It is to be hoped that this report, containing results of great interest and value to physical science, will soon be published.

The election of Prof. James E. Keeler, director of the Allegheny Observatory, to the directorship of the Lick Observatory was announced in last week's Nature. We now learn that Prof. Keeler has written a letter to the Chairman of the Allegheny Observatory Committee stating that he is prepared to decline the call to the Lick Observatory if within two weeks 200,000 dollars can be collected for the erection of a new observatory with a thirty-inch telescope, and towards the endowment of a chair of astronomy in the Western University of Pennsylvania. Efforts are being made to obtain this sum of money, and as much as 137,000 dollars has already been subscribed, while Allegheny City has given a site for a new observatory in an elevated position surrounded by parks, and comparatively free from smoke. We wonder how many British cities and citizens would show in such a substantial way their anxiety to keep a distinguished scientific investigator within their borders.

An interesting observation upon the development of a taste for honey by starlings is recorded by Mr. W. W. Smith in the *Entomologist* (April). In a previous note referring to some enemies of humble-bees in New Zealand, Mr. Smith stated that he had observed the newly-introduced starlings killing and conveying humble-bees to their nests to feed their young. The tui or parson-bird (*Prosthemadera novæ-zealandiæ*) has now been detected killing them at Akaroa on Banks Peninsula. The case is remarkable in illustrating how new habits are acquired, or family habits are developed in some species of birds when certain conditions are present. As the tui belongs to the starling family, and is one of the native honey-suckers, it is possible it also was killing humble-bees to feed its young when it discovered the honey-sac of the insects. The tui, while engaged in killing the bees, would discover their honey-sac, which would also lead to a continuance of the habit as a ready means of procuring their favourite food. An analogous case is also presented in some recently acquired habits of the starling. For two seasons Mr. Smith has observed what is undoubtedly an acquired taste and habit in the starling in New Zealand. Like the tui, this bird now frequents the flax-flats and sucks the honey from the richly mellifluous flowers. It appears probable that the eating of the humble-bee s honey-sac by the starlings developed, or is now developing, the taste for honey in these birds.

From the many papers before us dealing with kathodic rays, Röntgen rays, and the closely-allied phenomena of "electro-dispersion," we extract the following:—Prof. Battelli and Dr. Garbasso (*Nuovo Cimento*, vi. 4) examined more closely the action of kathodic rays on insulated conductors, with the view of testing the existence of indeformable rays in the interior of the Crookes' tube. Their results agree with the hypothesis that the different modes of action of kathodic and Röntgen rays depend on the different conditions of the medium in which the conductor is placed.—M. P. de Heen (*Bulletin de l'Académie Royale de Belgique*, 1898, pp. 188, 191) publishes two papers relating to the electro-dispersive power of Röntgenised air, and also of air modified by a Bunsen burner. In the first paper the author obtains, by the Bunsen burner, results which cannot be accounted for on Villari's theory of Röntgenised air, but indicate the existence of a special kind of energy, to which he applies the name *infra-electric*. In the second paper he describes four experiments dealing with the propagation of what he calls *anti-electric* energy behind shadows. The papers leave us a little uncertain as to M. de Heen's distinction between the terms *infra electric* and *anti-electric*; "anti"-electricity, we are told, includes both "infra"- and "ultra"-electricity, but the latter we do not see defined, at all events, in these two writings.

From Mr. A. A. Campbell Swinton we have received a reprint of his paper on adjustable X-ray tubes, read before the Röntgen Society.—Part iv. (vol. vii.) of the *Atti dei Lincei* contains two papers, one on the cryptoluminescence of metals, by Prof. A. Róiti; the other on the diffusion of Röntgen rays, by Drs. R. Malagoli and C. Bonacini. According to the two latter writers, (1) the two electrodes contemporaneously emit *ortho-kathodic* rays, but that which communicates with the negative pole of the excitor develops them the most intensely; (2) from the electrodes, at a certain stage of rarefaction, there seem to start two cones of radiation, one enclosed in the other or partially separate, carrying opposite charges; both are displaced by magnets subject to the same laws; (3) the violet anodic light, like the ortho-kathodic rays, is intensely affected by magnetic action, but it follows the opposite law, behaving like an electric current from the anode to the anti-anode; (4) it seems to follow that the anti-anodic system of Maltèzos is, perhaps, only a feeble anti-kathodic system, for between the two systems there is identity rather than mere analogy, and that not only in their effect on the glass.—The *Bulletin de la Société Française de Physique* (Nos. 108, 111) contains abstracts of two papers by M. Villard, the first dealing principally with the rays which produce the hemispherical illumination of "focus" tubes above the plane of the anti-kathode; the second dealing with the laws of variation of the resistance of a Crookes' tube, the electric attraction and repulsion of the seat of emission, the production of Goldstein's rays, and the nature of the kathodic rays. From their action in reducing crystals, silicates, oxides of copper, and other substances, M. Villard suggests that the kathodic rays are formed of molecules of hydrogen due to the traces of moisture left in the tube.—Dr. Josef R. v. Geitler, of Prague, contributes to the *Wiener Berichte* a paper on electric and magnetic decomposition of kathodic rays. The subject has been somewhat foreshadowed by Birkeland, and the investigation bears close analogy to one published by Prof. J. J. Thomson in October 1897. Like him the author, experimenting on the shadow of a wire placed in the kathodic pencil, has obtained a broadening out of the shadow, which appears bordered by a series of green fluorescent striæ separated by dark interspaces. Dr. Geitler claims, however, that his experiments are in many respects essentially distinct from Prof. Thomson's.

By the death recently reported from Allahabad of Sir Saiyid Ahmad Khan, Indian Moslems have lost a leader who devoted many years, with great success, to their educational welfare and to the extension of scientific knowledge. He may well be described as the apostle of education to the Mahomedans of India. His institute at Aligarh, with its own printing-press and journal, his Anglo-Oriental college at the same place, on the model of a college of Oxford or Cambridge, for the education of Mahomedans of the upper classes, are splendid monuments to his breadth of mind, his wisdom, and his energy. The following particulars of Sir Saiyid Ahmad's career are from an article in Wednesday's *Times*:—This great leader of his people and pillar of British rule, as he has been called, was born in Delhi in 1817. His ancestors, who claimed descent from the Prophet, are said to have originally come from the Herat Valley, and for several generations held high office in the Court of the Moghul Emperors of Delhi. In 1837, after his father's death, the young man entered the British service in the Court of the Judge at Delhi, and from that time until he finally retired from the service he remained in the judicial branch. It was immediately after the Mutiny also that he threw himself heart and soul into the cause of Mahomedan education, and one of his earliest steps was to establish a translation society which should prepare suitable books, the want of which he greatly felt. A few years later this useful association expanded into the Scientific Society of Aligarh, with its own press, from which translations of numerous works on history and various modern sciences have been issued for the use of Mahomedans. It was after a visit to England in 1870 that he bent his mind to the great undertaking of the Anglo-Oriental College at Aligarh, which was opened in 1873 by Sir William Muir, while the foundation-stone of the building now in existence was laid with much ceremony by Lord Lytton in 1877. Having retired from the service in 1876, Saiyid Ahmad was in 1878 appointed a member of the Viceroy's Council by Lord Lytton, the appointment being renewed for a further period by Lord Ripon. He has also been on the Legislative Council of the North-West Provinces. In 1888 he was made K.C.S.I. For many years past Sir Saiyid Ahmad's home at Aligarh has been the goal of the pilgrimages of many of the greatest personages in India, and his reception by his fellow-Mahomedans when he has gone to the Punjab or to Haidarabad has been semi-regal. His last years were wholly devoted to the prosperity of his college and institute, and most of his journeys have been made on their behalf. Anglo-Indians who knew him best are as enthusiastic in his praise as the Indian Mahomedans. To the end he never changed the main article of his social faith—that education was the one indispensable requirement of Indian Mahomedans if they were to maintain under the British Raj the high position which was their due.

An interesting address, by Prof. Thomas Gray, on the development of electrical science, in which the history of electrical progress since the beginning of the seventeenth century is traced, is published in *Science* of March 18 and 25.

Herr Freiherr v. Richthofen, President of the Berlin *Gesellschaft für Erdkünde*, contributes a note to the *Verhandlungen* on the spelling of Chinese names. With the ordinary German pronunciation, *Kiautschou* represents the Chinese name more correctly than *Kiaotschau*, *Tschifu* than *Chefoo*, *Niutschwang* than *Newchwang*, *Futschoufu* than *Foochowfoo*.

The whole of the first number of the new volume of the *Mittheilungen von Forschungsreisenden und Gelehrten aus den deutschen Schutzgebieten* is taken up with an exhaustive account of the drum language of the Duala, by Herr R. Betz This method of conversation at a distance reaches a higher development in the Duala region than in any other part of the Kameruns. The paper contains no fewer than 275 examples of signs and phrases.

From an advance proof of the tables relating to the output of coal and other minerals in 1897, published by the Home Office, we learn that 202,119,196 tons of coal were mined in the United Kingdom last year. This was an excess of nearly seven million tons over the output for 1896. Next to coal, the largest outputs were:—ironstone, 7,793,168 tons; fireclay, 2,682,472 tons; oil shale, 2,223,757 tons.

Prof. Dr. J. Walther contributes a further instalment of his studies of deserts to the *Verhandlungen* of the *Gesellschaft für Erdkünde zu Berlin*. Prof. Walther made an expedition into the waste regions of Transcaspia and Bokhara after the Geological Congress at St. Petersburg last year, and describes his observations on the erosive action of wind, of great ranges of temperature, and of the saline deposits in dried-up lakes. The paper forms an important addition to the author's geological work in similar regions of North America and North Africa.

The "Statesman's Year-Book," edited by Dr. J. Scott Keltie, with the assistance of Mr. I. P. A. Renwick, annually improves in character and increases in usefulness. The volume just published by Messrs. Macmillan and Co. is the thirty-fifth; and it contains in the 1166 pages the latest statistical and other data referring to all the States of the world. The special features this year are maps showing, by means of different colours, the distribution of British commerce throughout the world, a map illustrating the Niger question, and a series of coloured diagrams exhibiting the course of trade in leading countries during the past twenty-five years. Trustworthy information upon all questions of political and commercial geography can be obtained from the volume, which keeps its place as the most handy and complete annual of geographical statistics in existence.

The additions to the Zoological Society's Gardens during the past week include a Molucca Deer (*Cervus moluccensis*, ♂) from the Molucca Islands, presented by H.G. the Duke of Bedford; a Great-billed Touracou (*Turacus macrorhynchus*) from West Africa, presented by Mr. R. J. Nicholas; two Cambayan Turtle Doves (*Turtur senegalensis*) from West Africa, presented by Sir Edward Burne-Jones; a Macaque Monkey (*Macacus cynomolgus*) from India, presented by Captain Francis W. Bate; two Arctic Foxes (*Canis lagopus*) from the Arctic Regions, four Oyster-catchers (*Hæmatopus ostralegus*), European, purchased; a Caucasian Wild Goat (*Capra caucasica*, ♂, juv.) from the Caucasus, received in exchange; a Burchell's Zebra (*Equus burchelli*, ♀), born in the Gardens.

OUR ASTRONOMICAL COLUMN.

Spectrum Analysis of Meteorites.—A research of great interest has been undertaken by Messrs. W. N. Hartley and Hugh Ramage on the wide dissemination of the rarer elements and the mode of their association in the more common ores and minerals. The outcome of this work has led us to believe that the rarer metals are more widely distributed than was ever dreamt of, the authors showing that out of ninety-one iron ores obtained from the Dublin Royal College of Science, thirty-five contained the extremely rare metal gallium, while most of them contained constituents of an unusual character. Thus rubidium was commonly present: the magnetites invariably contained gallium, but no indium; the siderites all contained indium, but lacked gallium. In a more recent research they have investigated spectroscopically numerous meteoric ores, siderolites and meteorites (*Scientific Proc. of the R. Dublin Soc.*, vol. viii. (N.S.) Part vi., No. 68), the range of spectrum being between the wave-lengths 6000 and 3200, and the results they obtained in this case, arranged in tabular form, are of great interest. It is shown that the composition of different meteoric irons is very similar, though the proportions of constituents differ somewhat. Meteoric irons, different varieties of iron ores, and manufactured irons contain copper, lead, and silver. Gallium is a constituent of meteoric irons, but not of all meteorites, and occurs in varying proportions. Sodium potassium and rubidium are constituents of meteoric irons, but only in very small proportions. Meteoric stones, but not the irons, contain chromium and manganese. Nickel was found to be a principal constituent in all meteorites, meteoric irons, and siderolites, cobalt occurring in the two last varieties. The authors describe the chief points of difference between telluric and meteoric iron to be the absence of nickel and cobalt in any considerable proportion from the former, and the presence of manganese. Meteoric irons, on the other hand, contain nickel and cobalt as notable constituents, and, except in minute traces, manganese is absent. In referring to the photographic spectra of iron meteorites obtained by Sir Norman Lockyer from the Nejed and Obernkirchen meteorites, the authors point out that of the two lines, one described as "unknown," and the other as "doubtfully ascribed to iron," the former is certainly, and the latter probably, a gallium line. At the conclusion of their paper the authors give three plates, which reproduce the flame spectra of six metallic irons and three siderolites with comparison spectra.

Stellar Parallaxes.—Dr. Bruno Peter, during the years 1887 to 1892, made a series of parallax observations with the Leipzig heliometer. The results of this investigation have been published in vol. xxii. No. 4, and xxiv. No. 3, of the *Abhandlungen der Math.-Phys. Classe der K.S. Gesel. der Wissenschaften*; but Dr. Peter makes a short abstract in the *Astronomische Nachrichten*, No. 3483, which we briefly refer to here. In the following table, which brings together these results very clearly, ε represents the mean error of the parallax, and ε′ that for one evening. In the three references to the star Lal 18115, (1) relates to the preceding component, and (2) to the following one, while (3) deals with the pair as a whole. The last column gives the comparison stars employed in each case.

Star.		Proper motion.	Parallax.	ε	No. of obs.	ε′	Comparison stars.	
	m.	″	″	″		″	°	°
η Cassiopeiæ ...	4	1·20	+0·18	0 0,0	45	0·15	+57·112	+57·172
μ ,, ...	5·5	3·74	·13	·037	23	·16	53·207	54·241
Lal 15290... ...	8·5	1·97	·02	·043	32	·16	31·1648	30·1620
Lal 18115 (1) ...	8·0		·18	·027	22	·11	53·1309	53·1330
,, (2) ...	8·0		·18	·032	21	·12		
,, (3) ...		1·69	·18	·020	43	·11		
δ Ursa Maj. ...	3	1·11	·09	·035	22	·14	52·1389	51·1536
A-Oe. 10603 ...	6·5	1·45	·17	·013	27	·12	50·1707	49·1946
β Comæ	4	1·20	·11	·042	42	·18	28·2207	28·2184
31 Aquilæ ...	5·5	0·96	·06	·015	40	·16	11·3802	12·3929
Bradley 3077 ...	6	2·08	·13	·012	39	·14	56·2956	56·2978

JAMES WATT, AND THE DISCOVERY OF THE COMPOSITION OF WATER.[1]

When your Secretary did me the honour to communicate the wish of the Committee that I should deliver this lecture, he was good enough to send me a list of the names of my predecessors in the position I was invited to occupy, together with a statement of the subjects on which they had addressed you. I confess I read his letter with very mingled feelings. To be asked to form one of such a distinguished company was in itself an honour which I deeply appreciated. On the other hand, it seemed well-nigh hopeless to find any theme associated with the life and work of the great man whose services to humanity we are this day called upon to commemorate, that had not been dealt with by one or other of those who preceded me. Naturally, and as befits the subject, the greater number of those who have spoken on these occasions have been distinguished engineers and mechanicians, and they have been able to speak with a fulness of knowledge, and a weight of authority, on the outcome of the great engineer's labours to which I, who know nothing of engineering or machinery, can have no pretensions.

It occurred to me, however, on reflection, that there was one incident in Watt's career, which, so far as I could learn, had not been handled by any one of those whom you have invited to appear here, and to which, as it comes within my own province, I thought I might venture, without presumption, to engage your attention. I was the more impelled to select it in that it illustrates one side of Watt's intellectual activity which those who regard him only as an inventor and a mechanician are apt to undervalue or lose sight of altogether. It serves, too, to throw additional light upon his mental character and moral worth, and thus enables us to form a fuller and more just appreciation of the attributes of the man we wish to honour. The incident, in a word, relates to Watt's share in the establishment of the true view of the chemical nature of water.

To the historian of science this is doubtless an old story, on which it would be difficult to say anything new. The literature concerned with it occupies many volumes, largely owing to the circumstance that it has given rise to a controversy which has engaged the active interest of some of the strongest and subtlest intellects of this century. Some of the disputants have been men like Brougham, Jeffrey and Muirhead, skilled in the arts of advocacy and in the faculty of eliciting and weighing evidence, who have stated their conclusions with all the "pomp and circumstance" of a judicial finding; others are men like Arago, Dumas, Harcourt, Whewell, Peacock, Kopp, George Wilson,

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[1] The Watt Memorial Lecture, delivered in the Watt Memorial Hall, Greenock, on March 11, by Prof. T. E. Thorpe, LL.D., F.R.S.